SNOW SAMPLING SURVEY
in the vicinity of
NORANDA'S GECO MINE, MANITOUWADGE

January, 1982

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INTRODUCTION

A Ministry of the Environment study in February, 1978, revealed that cadmium, copper, iron, lead and zinc were elevated in snow sampled near a base metal mine and ore concentrator operated by the GECO Divison of Noranda Mines Limited near Manitouwadge (1). Vegetation and soil sampling surveys and moss exposure experiments (2,3) confirmed the presence of high metal levels in the area.

In 1981, GECO added emission control devices to its zinc concentrate dryer circuit. To document the expected reduction in deposition of airborne metals following this abatement program, a snow sampling survey was carried out in the same area studied in 1978.

METHODS

Duplicate samples of snow were collected on January 28, 1982 from 13 sites near the mine (Figure 1) and from two distant control points. Sampling sites were the same as those used in the 1978 survey (1). Cores of the complete snow profile were obtained following standard Ministry sampling procedures (3). The cores were melted indoors and the meltwater was submitted to the Ministry's Thunder Bay laboratory for determination of cadmium, copper, iron, lead, zinc and pH.

RESULTS AND DISCUSSION

Results from the 1978 and 1982 surveys are summarized in Table 1. Concentrations of cadmium and zinc were much lower in 1982 than in 1978. Lead and copper were usually moderately lower and iron was slightly lower. Cadmium, copper and zinc still

exceeded normal background concentrations at sites near the concentrator building and along rail spurs and roads servicing the mining operation.

The distribution pattern for zinc, in Figure 2, was similar to that for cadmium, copper, zinc and lead. Contaminant levels declined with increasing distance from the concentrator building, roads and railway lines.

Trace to light quantities of grey-black particulate matter were noted on the snow surface at sites 5, 8 and 11. Sample core depth averaged 70 cm (centimetres), and ranged from 50 cm to 91 cm.

CONCLUSIONS

A snow sampling survey carried out in 1982 near Noranda's GECO Mine at Manitouwadge revealed a decrease in heavy metals (particularly cadmium and zinc) from 1978 to 1982. This decline is attributed to abatement measures taken by the company. Although metal levels were still somewhat above normal in snow near the concentrator in 1982, no further abatement action seems warranted at present. Elevated metal concentrations are confined to company property and there is no evidence of adverse effects on the local environment.

REFERENCES

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4. Ontario Ministry of the Environment. 1983. Field investigation procedures manual. Phytotoxicology Section, Air Resources Branch.

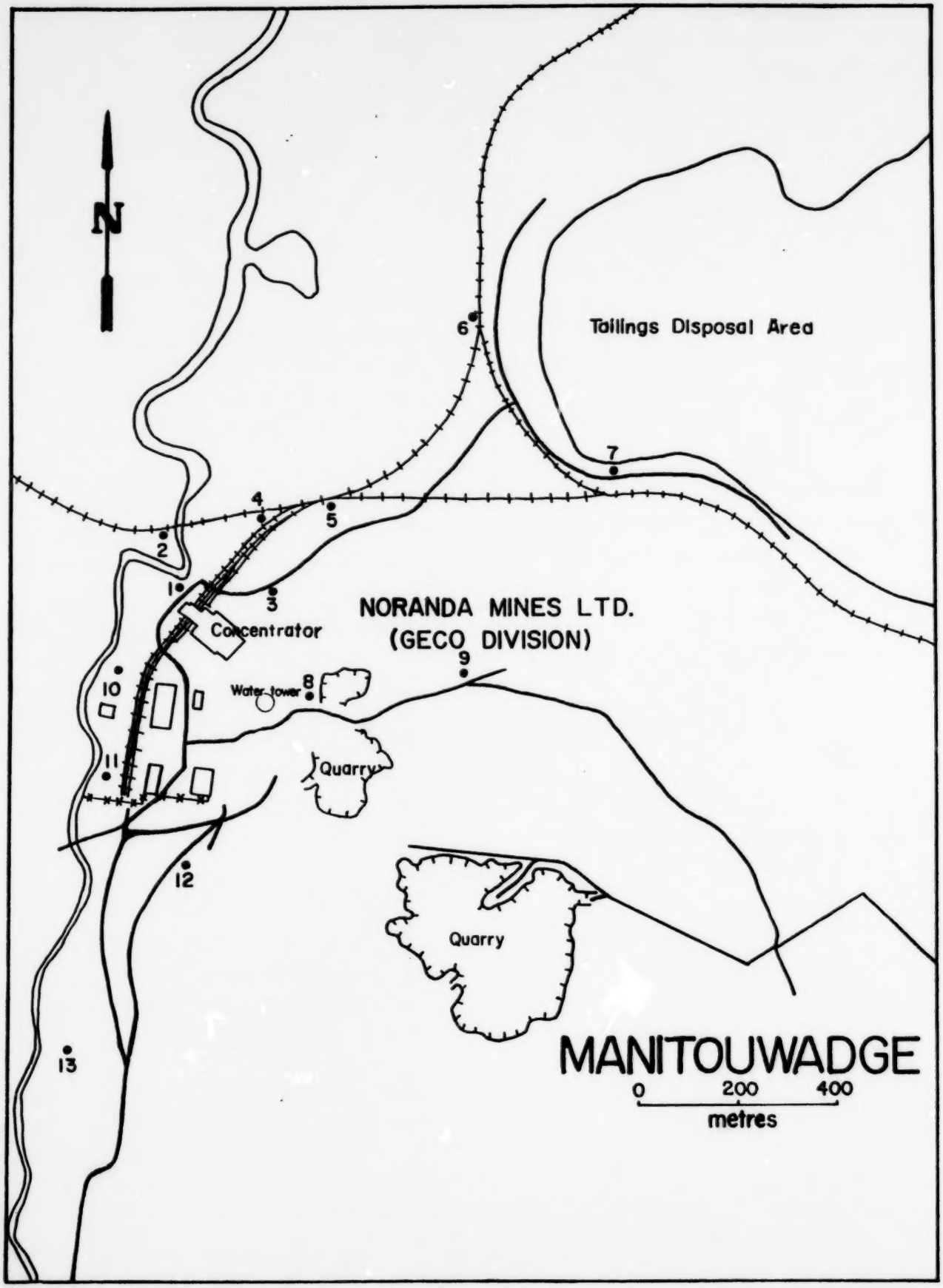

Figure 1. Snow sampling sites, Manitouwadge, January, 1982.

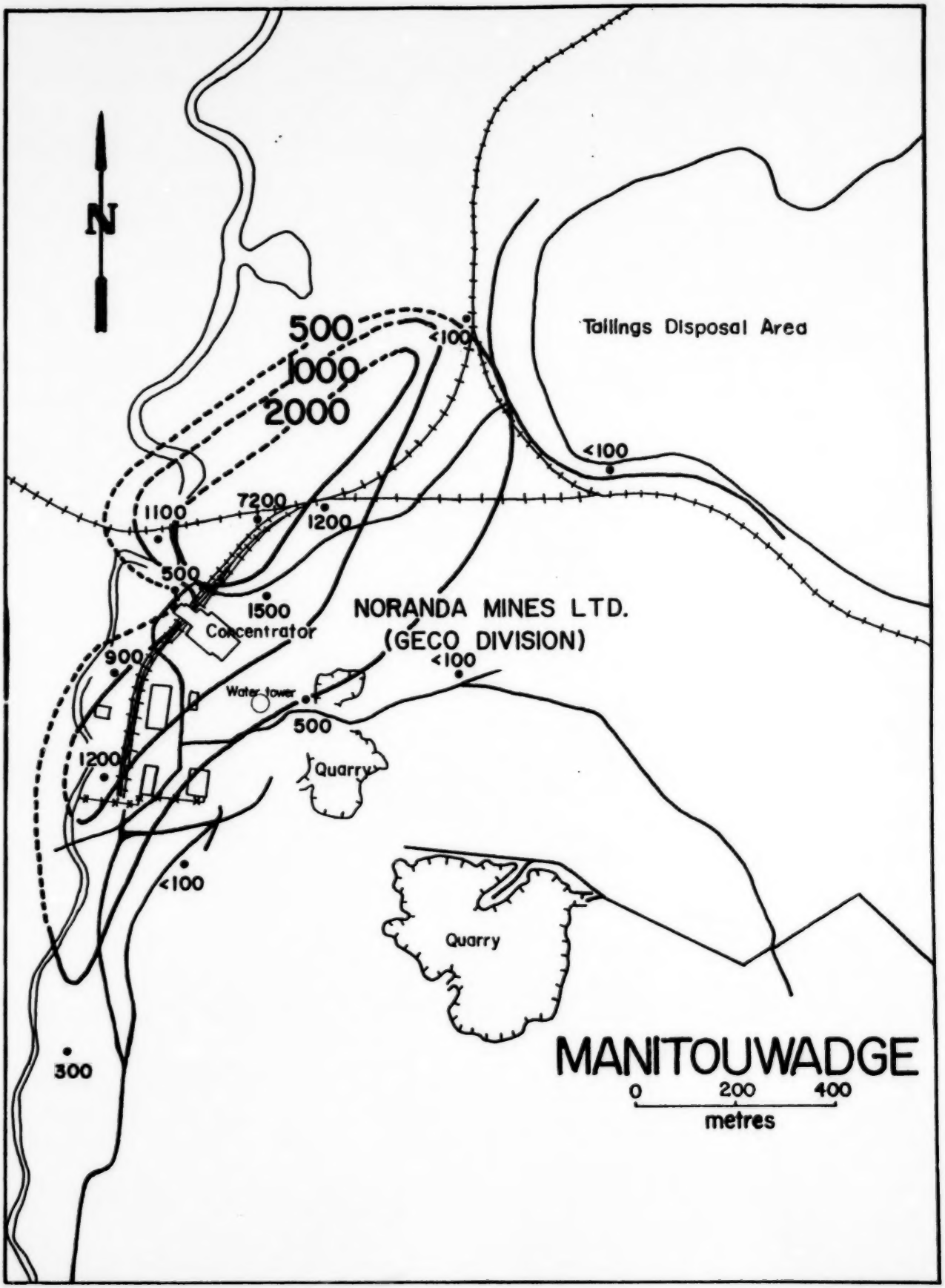

Figure 2. Levels of zinc (µg/l) in snow meltwater, January, 1982.

TABLE 1. Levels of cadmium, copper, iron, lead, zinc and pH in snow meltwater collected February, 1978 and January, 1982 in the vicinity of Noranda's GECO Mine, Manitouwadge.

Site	Cd (µg/l)		Cu (µg/l)		Fe (mg/ℓ)		Pb (µg/l)		Zn (mg/ℓ)		pH	
	1978	1982	1978	1982	1978	1982	1978	1982	1978	1982	1978	1982
1	32	2	200	84	1.0	0.3	64	10	3.8	0.5	7.2	4.5
2	13	6	48	90	0.4	0.4	8	14	1.2	1.1	5.4	4.3
3	130	9	1100	240	3.8	0.6	66	20	14.0	1.5	5.8	4.9
4	100	55	530	940	-	2.4	37	66	12.0	7.2	6.1	4.5
5	55	7	520	600	1.6	0.8	31	38	6.2	1.2	5.8	4.7
6	19	<1	80	29	1.0	0.2	10	6	2.0	<0.1	3.2	4.4
7	26	<1	140	34	1.9	0.7	14	6	2.8	<0.1	5.7	4.5
8	34	3	180	290	2.0	0.7	20	23	4.0	0.5	6.4	5.4
9	14	<1	67	28	0.6	0.3	10	9	1.5	<0.1	6.2	4.4
10	86	4	570	470	1.9	0.6	38	20	7.0	0.9	7.8	4.8
11	140	6	1000	940	3.4	1.1	54	58	14.0	1.2	5.7	5.2
12	37	<1	220	28	1.1	0.4	18	9	4.6	<0.1	6.2	4.4
13	98	2	480	170	2.0	0.4	40	23	9.3	0.3	6.0	5.8
Control	2	<1	1	4	<0.1	<0.1	<5	4	<0.1	<0.1	5.1	4.4
Normal background	<5		<100		<1		<50		<0.05			